28/5/1 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0015614466 E.I. COMPENDEX No: 2003367626537
Fabrication of micro- relief structures in thick resist for anti-counterfeiting applications
Leech, Patrick W.; Zeidler, Henning
Corresp. Author/Affil: Leech, P.W.: CSIRO Mfg. Infrastructure Technol., Melbourne, Vic., Australia
Editor(s): LaVan, D.A.; Ayon, A.A.; Buchheit, T.E.; Madou, M.J.
Conference Title: Nano- and Microelectromechanical Systems (NEMS and MEMS) and Molecular Machines
Conference Location: Boston, MA United States Conference Date: 20021202-20021204
E.I. Conference No.: 61408
Materials Research Society Symposium - Proceedings (Mater Res Soc Symp Proc) (United States) 2002, 741/- (73-78)
Publication Date: 20021201
Publisher: Materials Research Society
CODEN: MRSPD ISSN: 0272-9172
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: A; (Applications); T; (Theoretical)
Language: English Summary Language: English
Number of References: 10
Micro- relief surfaces including grating structures, greytone/micrographic features and microramps have been fabricated with depth features of up to 30 mum. Grey scale lithography has been used to produce the microstructures by a single UV exposure into a layer of thick resist. Arrays of the pixelated microstructures have formed the security features on the surface optically variable devices. Each of the microstructures was designed to provide an intended optical effect in features such as portraits, symbols and lettering which comprised a larger image (typically 2.5 x 3 cm). An essential part of the process has been the determination of the optimum conditions for coating of the thick resist (AZ P4620) as a function of spin speed and exposure.
Descriptors: Image analysis; Lithography; Micromachining; Microstructure; Optical devices; Optical properties; Ultraviolet radiation; * Surface treatment
Identifiers: Anticounterfeiting; Grating structures; Micro- relief structures; Thick resists
Classification Codes:
604.2 (Machining Operations)
622.2 (Radiation Effects)
714.2 (Semiconductor Devices & Integrated Circuits)
741.3 (Optical Devices & Systems)
802.3 (Chemical Operations)
933.1 (Crystalline Solids)

28/5/2 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0015260855 E.I. COMPENDEX No: 2002457190501
Achromatic features for optically variable devices
Schilling, Andreas; Staub, Rene; Tompkin, Wayne R.
Corresp. Author/Affil: Schilling, A.: OVD Kinegram Corp., Zahlerweg 12, CH-6301 Zug, Switzerland
Corresp. Author email: Andreas.Schilling@kinegram.com
Editor(s): Renesse, R.L.
Editor(s) Affil.: TNO Institute of Applied Physics, Delft, Netherlands
Conference Title: Optical Security and Counterfeit Deterrence Techniques IV
Conference Location: San Jose, CA United States Conference Date: 20020123-20020125
Sponsor: IS and T; SPIE
E.I. Conference No.: 60167
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) (United States) 2002, 4677/- (238-246)
Publication Date: 20021112

Publisher: SPIE
CODEN: PSISD ISSN: 0277-786X
DOI: 10.1117/12.462715
Document Type: Conference Paper; Conference Proceeding Record Type:
Abstract
Treatment: X; (Experimental)
Language: English Summary Language: English
Number of References: 3
We have studied the use of achromatic features in **Optically** Variable **Devices** (OVDs) for document **security** applications. We present various forms of matt structures as we have implemented them in OVD designs. By tailoring the scattering characteristics of the **surface relief**, we have created OVDs which appear in various intensities of white or gray, and whose brightness can vary as the viewing conditions are changed. Furthermore, we have realized **surface** reliefs which appear bright and colorless when viewed within a predetermined solid angle and appear dark in all other viewing directions. The gratings appear bright and colorless when viewed from one side of the grating normal; however, when these gratings are rotated by 180 degrees in their plane, the gratings appear dark. We will show gratings of this type, where the **surface** reliefs have been engineered so that the bright and colorless appearance covers an enlarged solid angle.
Descriptors: Color; Diffraction gratings; Electromagnetic wave **diffraction**; **Light scattering**; **Security** of data
Identifiers: **Optically variable devices** (**OVD**)
Classification Codes:
723.2 (Data Processing)
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)
711 (Electromagnetic Waves)

28/5/3 (Item 3 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0015260854 E.I. COMPENDEX No: 20024571905O0
Zero-order gratings for optically variable devices
Tompkin, Wayne R.; Schilling, Andreas; Wehteneder, Christoph; Herzig, Hans Peter
Corresp. Author/Affil: Tompkin, W.R.: OVD Kinegram Corp., Zahlerweg 12, 6301 Zug, Switzerland
Corresp. Author email: Tompkin@kinegram.com
Editor(s): Renesse, R.L.
Editor(s) Affil.: TNO Institute of Applied Physics, Delft, Netherlands
Conference Title: Optical Security and Counterfeit Deterrence Techniques IV
Conference Location: San Jose, CA United States Conference Date: 20020123-20020125
Sponsor: IS and T; SPIE
E.I. Conference No.: 60167
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) (United States) 2002, 4677/- (227-237)
Publication Date: 20021112
Publisher: SPIE
CODEN: PSISD ISSN: 0277-786X
DOI: 10.1117/12.462714
Document Type: Conference Paper; Conference Proceeding Record Type:
Abstract
Treatment: T; (Theoretical)
Language: English Summary Language: English
Number of References: 12
We present the results of the application of zero-order diffraction gratings for **optically variable devices** (**OVD**'s) for document **security**. Zero-order gratings have periods which are smaller than the wavelength of light; to describe accurately the optical properties of the zero-order gratings, we have applied rigorous electromagnetic theory, which we have compared to experimental measurements. We studied the diffractive behavior of zero-order gratings both in the case where the gratings are homogenous and where the profile depth of the zero-order grating varies locally in a predetermined manner. In the latter case, the resulting **surface** profile can exhibit variations in the diffraction properties, for

example, a moire pattern. Furthermore, we have developed diffractive **surface**-reliefs which are a combination of a high-frequency, zero-order grating with large-period gratings; the addition of the zero-order grating to a large-period grating results in a **surface relief** with novel diffractive properties.
Descriptors: Aspect ratio; Microstructure; Refractive index; **Security** of data; Solar collectors; *Diffraction gratings
Identifiers: **Optically variable devices** (**OVD**)
Classification Codes:
657.1 (Solar Energy & Phenomena)
723.2 (Data Processing)
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)

28/5/4 (Item 4 from file: 8)
DIALOG(R)File 8:EI Compendex(R)
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0015260853 E.I. COMPENDEX No: 2002457190499
Advantages of micro-optics over holograms for document authentication
Steenblik, Richard A.; Hurt, Mark J.; Knotts, Michael E.
Corresp. Author/Affil: Steenblik, R.A.: Visual Physics, 1050 Northfield Court, Roswell, GA 30076, United States
Editor(s): Renesse, R.L.
Editor(s) Affil.: TNO Institute of Applied Physics, Delft, Netherlands
Conference Title: Optical Security and Counterfeit Deterrence Techniques IV
Conference Location: San Jose, CA United States Conference Date: 20020123-20020125
Sponsor: IS and T; SPIE
E.I. Conference No.: 60167
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) (United States) 2002, 4677/- (215-226)
Publication Date: 20021112
Publisher: SPIE
CODEN: PSISD ISSN: 0277-786X
DOI: 10.1117/12.462713
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: T; (Theoretical)
Language: English Summary Language: English
Number of References: 7
Holograms have been utilized to authenticate financial instruments and high value products for many years. The **security** provided by embossed **holograms** is limited by their low **surface relief**, typically 0.25 micron, which makes them susceptible to counterfeiting: stripping the **hologram** from the **substrate** exposes the complete **holographic** microstructure which can be easily used to create counterfeit tooling. A large improvement in counterfeit deterrence can be gained by the use of high precision non-**holographic** microoptics and microstructures having a **surface relief** greater than a few microns. An unlimited range of distinctive optical effects can be obtained from micro-optic systems. Many of the possible optical effects, such as optical interactions between discrete elements, cannot be effectively simulated by any other means, including **holography**. We present descriptions of five Visual Physics document authentication micro-optic systems that provide sophisticated optical effects: Virtual Image(TM), BackLite(TM), Encloak(TM), Optical Black(TM), and Structural Color(TM). Visual Physics document authentication micro-optics impose an additional level of counterfeit deterrence because the production of polymer films incorporating these microstructures requires unconventional manufacturing methods; conventional **holographic** reproduction processes, typical of **hologram** counterfeiting operations, are inadequate to faithfully reproduce the details and the function of these micro-optic elements. We have developed mastering, tooling, and high precision/high speed manufacturing processes that can faithfully replicate these complex **surface relief** micro-optics at low cost.
Descriptors: **Holograms**; Microoptics; Microstructure; Optical systems; Plastic films; **Substrates**; * **Security of data**
Identifiers: Document authentication
Classification Codes:
712.1 (Semiconducting Materials)

723.2 (Data Processing)
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)
817.1 (Plastics Products)
743 (Holography)

28/5/5 (Item 5 from file: 8)
DIALOG(R)File 8:EI Compendex(R)
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0015250119 E.I. COMPENDEX No: 2002447176813
Holographic **applications** of As-S-Se inorganic resist
Kostyukevich, S.A.; Vlcek, M.; Moskalenko, N.L.; Shepeliavi, P.E.; Stronski, A.V.; Svechnikov, S.V.; Venger, E.F.
Corresp. Author/Affil: Kostyukevich, S.A.: Inst. for Physics of Semiconductors, NAS Ukraine, Kiev 03028, Ukraine
Editor(s): Angelsky, O.V.
Conference Title: Selected Papers from Fifth International Conference on Correlation Optics
Conference Location: Chernivtsi Ukraine Conference Date: 20010510-20010513
Sponsor: SPIE; ICO; ECS; Chernivtsi National University; Ukrtelecom (Ukraine)
E.I. Conference No.: 60094
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) (United States) 2002, 4607/- (184-188)
Publication Date: 20021104
Publisher: SPIE
CODEN: PSISD ISSN: 0277-786X
DOI: 10.1117/12.455188
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: T; (Theoretical); X; (Experimental)
Language: English Summary Language: English
Number of References: 5
The present paper is concerned with the investigation of imaging properties of As-S-Se media in application for fabrication of **holographic** optical **security** elements. Structural changes in such media under the influence of external factors (exposure or annealing) were studied. Photo-and thermally induced structural changes were directly confirmed by Raman scattering measurements. **Surface relief** formation properties were investigated with the help of improved amine based solvents, which provided good **surface** quality. Various types of **holographic security** elements (HSE) were fabricated and their properties studied. Fabricated **surface relief** provided high values of diffraction efficiency. For example, diffraction efficiency of such elements as **holographic** diffraction gratings consisted up to 60-70% in non-polarized light. High quality polymer copies of the initial HSE were obtained.
Descriptors: Diffraction gratings; **Holographic** optical elements; Optical variables measurement; Photoresists; Raman scattering; *Optical correlation
Identifiers: **Holographic security** elements (HSE)
Classification Codes:
743.1.1 (Optical Holography)
714.2 (Semiconductor Devices & Integrated Circuits)
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)
813.2 (Coating Materials)
941.4 (Optical Variables Measurements)

28/5/6 (Item 6 from file: 8)
DIALOG(R)File 8:EI Compendex(R)
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0015195468 E.I. COMPENDEX No: 2002397099147
Machine-verifiable diffractive features for document security
Tompkin, Wayne R.; Staub, Rene
Corresp. Author/Affil: Tompkin, W.R.: Landis and Gyr Communications Corp., Advanced Research, CH-6301 Zug, Switzerland
Editor(s): Renesse, R.L.

Conference Title: Optical Security and Counterfeit Deterrence Techniques II
Conference Location: San Jose, CA United States Conference Date: 19980128-19980130
Sponsor: IS and T; SPIE
E.I. Conference No.: 59674
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) (United States) 1998, 3314/- (203-213)
Publication Date: 19981201
Publisher: SPIE
CODEN: PSISD ISSN: 0277-786X
DOI: 10.1117/12.304687
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: A; (Applications); G; (General review)
Language: English Summary Language: English
Number of References: 11
We demonstrate the use of diffractive **surface - relief** profiles for the machine verification of official documents. The microstructures are engineered to yield a prescribed intensity distribution of the **diffracted light** which can be measured to insure unambiguous verification and authentication. We have developed a palette of machine-verifiable features, offering various capacities of information, ranging from a feature which is easily verified through visual inspection using a special aid, to a feature capable of representing hundreds of bits of information in a read-only diffractive optical memory. The proposed features which we will present here are the hidden-information features, the diffractive area code and the diffractive linear code. For each of the three proposed features, we present prototype systems demonstrating the use of machine-verifiable diffractive optical features incorporated into **optically variable devices** (OVDs) for document **security**. Specially engineered diffractive structures are used which are extremely resilient against counterfeit, reorigination or imitation. The machine-readable feature is combined with a visual **security** device, such as the products known under the tradename KINEGRAM(R).
Descriptors: Diffraction gratings; Feature extraction; Optical devices; Optical image storage; ROM; * **Security** of data
Identifiers: Document **security**; Machine verifiable diffractive features; **Optically variable devices**
Classification Codes:
722.1 (Data Storage, Equipment & Techniques)
723.2 (Data Processing)
723.5 (Computer Applications)
741.3 (Optical Devices & Systems)

28/5/7 (Item 7 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0014839760 E.I. COMPENDEX No: 2001306591114
Get glitzy with Holoprism
Print and Paper Europe (Print Pap. Eur.) (United Kingdom) 2001, 13/2 (8)
Publication Date: 20010627
Publisher: Whitmar Publications Ltd.
CODEN: PPERAC ISSN: 1471-3063
Document Type: Note; Trade Journal Record Type: Abstract
Treatment: G; (General review)
Language: English Summary Language: English
Holoprism is a **holographic** product in which the metallized **surface diffracts light** into dazzling rainbow of colors to create a choice of unique effects for designers and printers. Inorder to depict printing on Holoprism opaque white ink and four color processes are used with 70s and 80s retro style images. The process creates a bright or subtle image as required. Tags, labels, packaging, games and **security** items are applications of Holoprism.
Descriptors: Color; Competition; Diffraction; Ink; Packaging; Printing; * **Holography**
Identifiers: Holoprism
Classification Codes:
811.1.2.2 (Machinery Equipment & Maintenance)

911.2 (Industrial Economics)
745.1 (Printing)
741.1 (Light & Optics)
694.1 (Packaging)
804 (Chemical Products Generally)
743 (Holography)

28/5/8 (Item 8 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0014587384 E.I. COMPENDEX No: 2000285189113
Self-referencing diffractive features for OVD's
Staub, Rene; Tompkin, Wayne R.
Corresp. Author/Affil: Staub, Rene: OVD Kinegram Corp, Gubelstrasse, Switzerland
Conference Title: Optical Security and Counterfeit Deterrence Techniques III
Conference Location: San Jose, CA, USA Conference Date: 20000127-20000128
Sponsor: IS and T; SPIE
E.I. Conference No.: 56826
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) 2000, 3973/- (216-223)
Publication Date: 20001203
Publisher: Society of Photo-Optical Instrumentation Engineers
CODEN: PSISD ISSN: 0277-786X
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: G (General review)
Language: English Summary Language: English
Number of References: 15
We will show various diffractive features which are easy to verify and highly **secure** against attempts to counterfeit. These features are based on engineered **surface relief** structures which allow one to tailor the diffraction properties to obtain the desired effects. The **security** is based on complex diffraction structures rather than on complex image content, allowing the realisation of relative simple feature designs, which are favourable from an ergonomic point of view. The unique properties of the engineered diffraction structures can be visualised, if an appropriate reference is provided, against which the observer can compare. We follow the idea that the optical effects in a well designed **security** feature must be interdependent in the sense of coherence or self-referencing. Various examples are presented, showing unique self-referencing first-line **security** features for document applications, which are clearly recognisable and easy to communicate. The presented effects are resilient against attempts to counterfeit by **holographic** techniques.
Descriptors: Diffractive optics; Electronic crime countermeasures; Electronic document identification systems; **Holography**; **Security of data**; *Diffraction gratings
Identifiers: Counterfeit; Self referencing
Classification Codes:
715.1 (Electronic Equipment, Non-Communication)
723.2 (Data Processing)
723.5 (Computer Applications)
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)
743 (Holography)

28/5/9 (Item 9 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0014587383 E.I. COMPENDEX No: 2000285189114
Computer generated holograms and diffraction gratings in optical security applications
Stepien, Pawel
Corresp. Author/Affil: Stepien, Pawel: Polskie Systemy Holograficzne s.c., Warszawa, Poland
Conference Title: Optical Security and Counterfeit Deterrence Techniques

|||
Conference Location: San Jose, CA, USA Conference Date: 20000127-20000128
Sponsor: IS and T; SPIE
E.I. Conference No.: 56826
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) 2000, 3973/- (224-230)
Publication Date: 20001203
Publisher: Society of Photo-Optical Instrumentation Engineers
CODEN: PSISD ISSN: 0277-786X
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: A; (Applications)
Language: English Summary Language: English
Number of References: 10
The term 'computer generated **hologram**' (CGH) describes a diffractive structure strictly calculated and recorded to **diffract** **light** in a desired way. The CGH **surface** profile is a result of the wavefront calculation rather than of interference. CGHs are able to form 2D and 3D images. **Optically** **variable** **devices** (OVDs) composed of diffractive gratings are often used in **security** applications. There are various types of optically and digitally recorded gratings in **security** applications. Grating based OVDs are used to record bright 2D images with limited range of cinematic effects. These effects result from various orientations or densities of recorded gratings. It is difficult to record high quality OVDs of 3D objects using gratings. Stereograms and analogue rainbow **holograms** offer 3D imaging, but they are darker and have lower resolution than grating OVDs. CGH based OVDs contains unlimited range of cinematic effects and high quality 3D images. Images recorded using CGHs are usually more noisy than grating based OVDs, because of numerical inaccuracies in CGH calculation and mastering. CGH based OVDs enable smooth integration of hidden and machine readable features within an OVD design.
Descriptors: Diffraction gratings; **Holograms**; Optical devices; **Security** of data; Three dimensional; Two dimensional; *Computer generated **holography**
Identifiers: Cinematic effects; Computer generated **holograms**; Optical **security**; **Optically** **variable** **devices**; Stereograms
Classification Codes:
723.2 (Data Processing)
723.5 (Computer Applications)
741.3 (Optical Devices & Systems)
743.1 (Holographic Techniques)

28/5/10 (Item 10 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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0014013398 E.I. COMPENDEX No: 1998063964033
Review of materials for holographic **optics**
Colburn, W.S.
Corresp. Author/Affil: Colburn, W.S.: Kasar Optical Systems, Inc, Ann Arbor, United States
Journal of Imaging Science and Technology (J Imaging Sci Technol) 1997, 41/5 (443-456)
Publication Date: 19971201
Publisher: Soc Imaging Sci Technol
CODEN: JIMTE ISSN: 1062-3701
Document Type: Article; Journal Record Type: Abstract
Treatment: G (General review)
Language: English Summary Language: English
Number of References: 204
The success of applications involving **holographic** optical elements depends on the performance of the recording materials used to form the elements. Selection criteria of a recording material must include not only the usual optical considerations such as achievable diffraction efficiency and optical quality, but also the environmental stability and the ease and cost of manufacture of the elements. Three materials are in widespread use and development for **holographic** optics applications: dichromated gelatin, photopolymer, and photoresist. Dichromated gelatin forms very high-quality **holograms**, but is relatively difficult to produce and must be protected from moisture. Dichromated gelatin **holograms** are in use as head-up

display combiners, narrowband filters, and diffraction gratings. Photopolymer is generally easier to use, typically does not require wet processing, and usually has good environmental stability. Photopolymer holograms are in use or under development for several applications including laser eye protection filters, automotive lighting devices, and security holograms. Photoresist forms surface relief holograms that can be replicated by epoxy or, for large production runs, by embossing techniques. Photoresist holograms are used as diffraction gratings for scientific applications, as patterns for fabrication of photonic devices, and as master holograms for security applications such as credit card holograms.
Descriptors: Gels; Image quality; Image recording; Performance; Photoresists; Polymers; Stability; * Holographic optical elements
Identifiers: Dichromated gelatin; Photopolymers
Classification Codes:
743.1.1 (Optical Holography)
714.2 (Semiconductor Devices & Integrated Circuits)
741 (Light, Optics & Optical Devices)

28/5/11 (Item 11 from file: 8)
DIALOG(R)File 8:EI Compendex(R)
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0013699179 E.I. COMPENDEX No: 19964493231098
Combination gratings
Staub, Rene; Tompkin, Wayne R.; Moser, Jean-Frederic
Corresp. Author/Affil: Staub, Rene: Landis & Gyr Communications, Corp., Zug, Switz
Editor(s): Cindrich, Ivan; Lee, Sing H.
Editor(s) Affil.: Environmental Research Institute of, Michigan, Laguna Niguel, CA, United States
Conference Title: Diffractive and Holographic Optics Technology III
Conference Location: San Jose, CA, USA Conference Date: 19960201-19960202
Sponsor: SPIE - Int Soc for Opt Engineering, Bellingham, WA, USA
E.I. Conference No.: 22558
Proceedings of SPIE - The International Society for Optical Engineering (Proc SPIE Int Soc Opt Eng) 1996, 2689/- (292-299)
Publication Date: 19960101
CODEN: PSISD ISBN: 0819420638; 9780819420633
Document Type: Conference Paper; Conference Proceeding Record Type: Abstract
Treatment: T; (Theoretical)
Language: English Summary Language: English
Number of References: 9
A combination grating is the diffractive relief structure resulting from the superposition of at least two gratings. For the case of two combined gratings, whose individual profiles are described by function f SUB 1 and f SUB 2, the resultant surface relief profile is described by f SUB 1 + f SUB 2. Typical examples are crossed gratings. Experimental and theoretical results for different combination gratings are presented, including examples which cannot be produced using standard holographic or ruling techniques. The applications include diffractive optical variable devices, which are applied to documents as visual high-security features.
Descriptors: Diffraction; Holography; Mathematical models; Optical devices; Surface properties; * Diffraction gratings
Identifiers: Combination gratings; Crossed diffraction gratings; Diffractive optical variable devices; Diffractive relief structures; Surface relief profiles
Classification Codes:
741.1 (Light & Optics)
741.3 (Optical Devices & Systems)
931.2 (Physical Properties of Gases, Liquids & Solids)
743 (Holography)
921 (Applied Mathematics)

28/5/15 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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07379109 Genuine Article#: 157XY Number of References: 17
Title: **Gratings of constantly varying depth for visual security devices**
Author(s): Staub R (REPRINT) ; Tompkin WR; Schilling A
Corporate Source: OVD KINEGRAM CORP, ADV RES/CH-6301 ZUG//SWITZERLAND/ (REPRINT); UNIV NEUCHATEL, INST MICROTECHNOL/CH-2000 NEUCHATEL//SWITZERLAND/
Journal: OPTICAL ENGINEERING, 1999, V38, N1 (JAN), P89-98
ISSN: 0091-3286 Publication date: 19990100
Publisher: SPIE - INTERNATIONAL SOCIETY FOR OPTICAL ENGINEERING, PO BOX 10, BELLINGHAM, WA 98227-0010
Language: English Document Type: ARTICLE
Geographic Location: SWITZERLAND
Subfile: CC PHYS--Current Contents, Physical, Chemical & Earth Sciences; CC ENGI--Current Contents, Engineering, Computing & Technology
Journal Subject Category: OPTICS
Abstract: Sinusoidal gratings of locally varying profile depth are incorporated into diffractive optically variable image devices (DOVIDs) for document **security**. The variation in profile depth is tailored to specific visual effects that can be readily authenticated. While the diffractive characteristics of these gratings depend very sensitively on the depth, the **security** of these DOVIDs is inherent to the diffractive structures insofar as the exact reconstruction of the original profile is required for the realization of the original visual effects. Sinusoidal gratings of locally varying profile depth are very resistant against copying by standard **holographic** techniques since these techniques are shown to lead to a loss of fidelity in profile form or depth. (C) 1999 Society of Photo-Optical Instrumentation Engineers. [S0091-3286(99)00101-4].
Descriptors--Author Keywords: diffractive optically variable image device ; diffraction gratings ; optical **security**
Identifiers--KeyWord Plus(R): **SURFACE - RELIEF** GRATINGS; DIFFRACTION
Cited References:
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MOSER JF, 1998, PCHP, OPTICAL DOCUMENT SEC
MOSER JF, 1996, V2689, P53, P SOC PHOTO-OPT INS
PATORSKI K, 1989, V27, P1, PROG OPTICS
SCUPARIS H, 1995, P165, HOLOPACK HOLOPRINT G
TURUNEN J, 1997, P31, MICROPTICS ELEMENTS
VANRENESSE RL, 1998, OPTICAL DOCUMENT SEC

28/5/16 (Item 1 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management
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01032750 E96107202062
Optical memories for document security
(Optische Speicher fuer die Dokumentsicherheit)
Tompkin, WR; Staub, R; Moser, J-F
Landis & Gyr Communications, Zug, CH
Optical Security and Counterfeit Deterrence Techniques, San Jose, USA, Feb 1-2, 19961996
Document type: Conference paper Language: English
Record type: Abstract

ABSTRACT:
The authors demonstrate the use of diffractive optical memories for official documents, such as machine-readable identity or fiduciary papers. Through engineering of the diffractive micro-structures, the direction and intensity distribution of the **diffracted light** can be tailored to optical memories for high **security**, uniqueness and unambiguous

verification. The proposed optical memory is of the WORM-type, that is, write-once, read-many times. In order to write in the optical memory, the diffractive structure is changed irreversibly through the interaction of the diffractive surface with a beam of laser light. The authors demonstrate optical memories based on diffractive structures with a memory capacity of up to 100 kBits/cm(exp 2) which are appropriate for use in securing official documents.

DESCRIPTORS: OPTICAL STORAGE; WORM DISCS; LIGHT DIFFRACTION; LASER BEAMS; STORAGE CAPABILITIES; DOCUMENT; SAFETY ENGINEERING; PHYSICAL PROPERTIES; INFORMATION PRESENTATION; LIGHT RECEIVERS; SYSTEM RELIABILITY; CODES; HOLOGRAPHIC DIFFRACTION GRATING
IDENTIFIERS: optische Datenspeicherung; Dokumentsicherheit; Lichtbeugung

28/5/17 (Item 2 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management
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01032749 E96107203062
High security transparent overlays - A new method for selective demetallization of fully registered embossed holograms
(Hochsicherheitstransparentauflagen - Ein neues Verfahren fuer die selektive Demetallisierung vollstaendig registrierter gepraegter Hologramme)
Schipper, W
Holgramm Co. Rako, Witzhave, D
Optical Security and Counterfeit Deterrence Techniques, San Jose, USA, Feb 1-2, 19961996
Document type: Conference paper Language: English
Record type: Abstract

ABSTRACT:
Optically Variable Devices (OVDs) are relatively new security features which are currently finding widespread application on a variety of security documents as a means of protection against counterfeiting. The OVD is in general a complex optical recording and the commonest form seen today is based on the presence of optically diffracting features, which are manufactured using embossing technology. This presentation will deal with one particular type of security product - a transparent or semi-transparent document overlay which may include an OVD combined both with UV-fluorescent or other special links, and may also include individualised information applied by laser-engraving technology. The main applications lie in the field of paper-based security documents such as passports, visas, driver's licences and ID cards.

DESCRIPTORS: MANUFACTURING TECHNIQUE; TRANSPARENT MEDIUM; OPTICAL TRANSPARENCY; FLUORESCENCE; ULTRAVIOLET LASERS; LASERS; OPTICAL SYSTEMS; OPTICAL INSTRUMENTS; SAFETY ENGINEERING; DOCUMENT; OPTICAL STORAGE; HOLOGRAM; PROTECTIVE GEAR; PROTECTIVE MEASURE; LIGHT DIFFRACTION; PLASTICS FOILS; SYSTEMS INTEGRATION; OPTICAL PROPERTIES
IDENTIFIERS: DEMETALLISIERUNG; Transparentfolie; Demetallisierung; Hologramm; Dokument

28/5/29 (Item 1 from file: 248)
DIALOG(R)File 248:PIRA
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00632273 Pira Acc. Num: 20224375
Title: Newest developments in high resolution security holography
Authors: Zolotukhin M
Source: Future of secure documents, Prague, Czech Republic, 1-2 Dec. 2002, 9pp [Leatherhead, UK: Pira International, 2002, GBP110.00 (655.004.4)(R14520)
Publication Year: 2002
Document Type: Conference Publication
Language: English
Pira Subfiles: Packaging (PK); Printing and Publishing (PP); Printing Abstracts (PT)
Journal Announcement: 0304
Abstract: The fact that holograms are open to counterfeiting is

indisputable. Most visual **security** features are vulnerable to counterfeit and **surface relief** copying and contact copying are a threat for many applications. One of the new aims in **security holography** is the move from a single level device to a multilevel **security** and authentication system. The E-Direct vector-based electron beam origination system is a new proprietary system developed by Optaglio, UK. This flexible topology direct-write system has a resolution of 254,000dpi, continuous forensic nanographics and "fingerprint" structure topology. Future developments in **security holography** will include restricted proliferation origination technology, high resolution, multilevel authentication, a strong visual feature programme, simple and reliable field verifiers, extensive forensic feature package and an anti copy programme. This paper was presented in the form of overheads.
Company Names: Pira International; Optaglio
Trade Names: E-Direct
Descriptors: AUTHENTICATION; CONFERENCE; COUNTERFEITING; ELECTRON BEAM HOLOGRAM; INNOVATION; MULTILAYER TECHNOLOGY; **SECURITY** PRINTING
Section Headings: Labels (3310); **Security** Printing (8615)

28/5/30 (Item 2 from file: 248)
DIALOG(R)File 248:PIRA
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00631672 Pira Acc. Num: 20223874
Title: Simulating the 3D gloss effects of scratchograms
Authors: Granberg H; Coppel L; Sunnegardh F; Beland M-C
Source: 11th International printing and graphic arts conference, Bordeaux, France, 1-3 Oct. 2002, vol 2, session 8, 8pp [Paris, France: Association Technique de l'Industrie Papetiere, 2002, 486pp, 2 vols, Euro180] (C, K, P)
Publication Year: 2002
Document Type: Conference Publication
Language: English
Pira Subfiles: Paperbase (PB); Printing and Publishing (PP); Printing Abstracts (PT)
Journal Announcement: 0303
Abstract: The Monte-Carlo based Grace **light scattering** programme was evaluated as a method of simulating scratchograms. Scratchograms are series of circular scratches on a **surface** which generate a three dimensional **hologram** like figure when illuminated in the correct way. The Grace simulation programme described paper, as a three dimensional structure including rough **surfaces**, coating, ink and basesheet **layers**, and treated the incident light as indivisible wave packets. The **surface** was spatially filtered to separate waviness from microroughness. The combination of these two effects produced the **surface** scattering. Simulated scratches on a planar **surface** were illuminated by a light beam to give an observable cube effect. The directionality of illumination and the influence of degrees of micro roughness and waviness on the scratchogram quality were evaluated. The perspective of the cube generated by reflected light varied in a way similar to the behaviour of real scratchograms. Image to background ratios decreased with increasing microroughness, indicating the suitability of papers with low microroughness in providing clear images. The Grace simulator was an effective tool for testing and optimising scratchogram performance. (4 fig, 7 ref)
Company Names: ATIP
Descriptors: EVALUATION; GLOSS; **HOLOGRAM**; ROUGHNESS; SCRATCH; SIMULATION; TOPOGRAPHY; WAVINESS
Section Headings: Paper, **board** and nonwovens printing technology (1259); **Security** Printing (8615)

28/5/31 (Item 3 from file: 248)
DIALOG(R)File 248:PIRA
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00619693 Pira Acc. Num: 20213967
Title: Semi-transparent optical coating for security holograms
Authors: Casey J
Source: Flexo Gravure Int. vol. 8, no. 2, June 2002, pp 26-30
ISSN: 0949-9709

Publication Year: 2002
Document Type: Journal Article
Language: English
Pira Subfiles: Packaging (PK); Printing and Publishing (PP); Printing Abstracts (PT)
Journal Announcement: 0209
Abstract: A new semi transparent optical coating method has been developed, which is based on the evaporation of zinc sulphide (ZnS). The technique is being used for **security** applications and offers high reflectance and good uniformity. Document features are protected using an overlay of semi transparent, diffractive optically variable image device (DOVID) **holograms**. Semi transparent DOVID **holograms** are created by embossing a **relief** pattern into a base lacquer, which is then applied to a flexible plastic **substrate**. Vacuum web coating technology is used to evaporate a highly refractive index (HRI) material onto the embossed **surface**. A clear top lacquer is used for protection. The HRI coating alters the reflectivity of the DOVID, and any attempt to tamper with it leads to loss of reflectivity. Titanium dioxide and zirconium dioxide can also be evaporated in this way, but are more expensive. In contrast, zinc sulphide is cheaper, easier to use and offers good reflectance between 35%-40% at 550nm incident wavelength. Plasma pretreatment improves the adhesion of the ZnS coating. (8 fig, 1 tab)
Descriptors: COATING; DIFFRACTIVE; **HOLOGRAM**; LACQUER; **OPTICALLY VARIABLE DEVICE**; PLASMA TREATMENT; REFLECTIVITY; **SECURITY** PRINTING; TAMPER PREVENTION; ZINC SULPHIDE
Section Headings: Labels (3310); Labelling marking coding and overprinting (3752); **Security** Printing (8615)

28/5/32 (Item 4 from file: 248)
DIALOG(R)File 248:PIRA
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00593935 Pira Acc. Num: 20191521
Title: Metal security DOVIDs
Authors: Tethal T
Source: Authentication and counterfeiting protection conference, Prague, Czech Republic, 14-16 Mar. 2001, 7pp [Leatherhead, UK: Pira International, 2001, GBP95.00 (621.798.64)(R13735)
Publication Year: 2001
Document Type: Conference Publication
Language: English
Pira Subfiles: International Packaging Abstracts (PK)
Journal Announcement: 0108
Abstract: The company Metallic **Security** Ltd is introducing diffractive optically variable image devices (DOVIDs) effectively multiplied into metal **surfaces**, under the trademark OVMetal. OVMetal is a metal safety component that can have almost any shape within typical parameters from a few millimetres to several centimetres. On the **surface** of this component is a difractional **relief**, which is a direct part of the metal base. Metal with **relief** protected by a special **layer** allows applications in environments in which classical foil technologies fail. The mechanical properties of OVMetal are described, together with types of OVMetal, and applications.
Company Names: Pira International; Reconnaissance International; Metallic **Security**
Trade Names: OVMetal
Descriptors: APPLICATION; **HOLOGRAPHY**; MECHANICAL PROPERTIES; **OPTICALLY VARIABLE DEVICE**; **SECURITY**
Section Headings: Distribution codes and symbols (3810)

28/5/33 (Item 5 from file: 248)
DIALOG(R)File 248:PIRA
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00512486 Pira Acc. Num: 40018974
Title: Security Hologram
Authors: Walters G J
Patent Assignee: Advanced Deposition Technologies Inc
Patent Number: US 5742411 Patent Date: 980421
Application number: US 631112 Application Date: 960423

Publication Year: 1998
Document Type: Patent
Language: English
Pira Subfiles: Imaging Abstracts (IA)
Journal Announcement: 9805
Abstract: A **security** **hologram** is described which consists of a **substrate** bearing the following **layers**, in order from the **substrate** upwards: a microprism **layer**, an opaque patterned metal **layer**, a **surface** **relief** **hologram** **layer**, and a semi-transparent metal **layer**. The arrangement is such that the **surface**-**relief** **hologram** can be observed in normal ambient illumination, but the patterned metal **layer** becomes visible only when viewed in a focused beam of bright light.
Descriptors: **Holography** - Applications
Section Headings: **HOLOGRAPHY** AND INTERFEROMETRY (6055)

28/5/34 **(Item 6 from file: 248)**
DIALOG(R)File 248:PIRA
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00305781 Pira Acc. Num: 10180431 Pira Abstract Numbers: 08-92-PT01425
Title: SCROLL WORK DESIGN SYSTEM COMPOSITE HOLOGRAM
Authors: Anon
Source: Jpn Gr. Arts vol. 33, Dec. 1991, p. 104A + 104U
Publication Year: 1992
Document Type: Journal Article
Language: English
Pira Subfiles: Printing and Publishing (PP); Printing Abstracts (PT)
Journal Announcement: 9204
Abstract: Dainippon Printing Co. Ltd, Japan, used computer graphics to develop a scroll work design system to prevent forgeries of stock and bond certificates. Simpler to operate than traditional etching devices, the operator controlled computer creates a design on the monitor, adding graduations to the pattern while outputting. The company investigates use of the system in graphic design. Toppan Printing Co. Ltd, Japan produces a very high **security** **hologram** by including a grating image on a three-dimensional **hologram** image. The grating image **surface** comprises numerous minute **diffraction** gratings. Visible **light** is reflected in many ways, diffracted, and the whole may be seen as a regular pattern. The many-pointed diffraction lattice, difficult to make, defies **forgery**. (Short article)
Company Names: DAI NIPPON PRINTING CO. LTD; TOPPAN PRINTING CO. LTD
Geographic Locations: ASIA; JAPAN
Geographic Codes: AS; ASJAP
Descriptors: BOND; CERTIFICATE; COMPANY; COMPOSITE; DESIGN; DIFFRACTION; ETCHING; **FORGERY**; GRAPHICS; GRATING; **HOLOGRAM**; IMAGE; MONITOR; OPERATOR; SCROLLING; **SECURITY**; SHORT; SYSTEM; THREE-DIMENSIONAL
Section Headings: **Holography** (8518)

28/5/35 **(Item 7 from file: 248)**
DIALOG(R)File 248:PIRA
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00217705 Pira Acc. Num: 9681150 Pira Abstract Numbers: 08-91-PT00309
Title: BLOCKFOIL'S BLOCKBUSTERS
Authors: Millichip J
Source: Lithoweek vol. 12, no. 42, 17 Oct. 1990, p. 25
ISSN: 0264-732X
Publication Year: 1990
Document Type: Journal Article
Language: English
Pira Subfiles: Printing and Publishing (PP); Printing Abstracts (PT)
Journal Announcement: 9101
Abstract: At Interphex in November 1990, UK Blockfoil will launch Securigrafix, a blocking **security** system as difficult to forge as a **hologram** but a tenth the cost, needing neither model nor expensive original. Suitable for ordinary foil, the image may be easily altered, requiring no remake of a model. The secret is in the dye, each dye being handmade and destroyed after use. The lettering overlaps, having a lenticular effect. A two-dimensional moving image is in development. The system is based on the company's Lumigrafix system using **light**

diffraction to create image depth when foiling. Football tickets, credit cards, and alcohol, drugs and perfume cartons are targetted. (Short article)

Company Names: BLOCKFOIL

Trade Names: INTERPHEX; LUMIGRAFIX; SECURIGRAFIX

Geographic Locations: EUROPE; UNITED KINGDOM

Geographic Codes: EU; EZUKM

Descriptors: ALCOHOL; BASED; BLOCKING; CARTON; COST; CREDIT CARD; DEPTH; DEVELOPMENT; DIFFRACTION; PHARMACEUTICAL; DYE; EFFECT; EXPENSIVE; FOIL; FOOTBALL; FORGE; HANDMADE; HOLOGRAM; IMAGE; LENTICULAR; LETTERING; LIGHT; MODEL; NEW EQUIPMENT; NEW MATERIAL; PERFUME; SECURITY; SECURITY PRINTING; SHORT; SUITABLE; SYSTEM; TICKET

Section Headings: Hot Foil Stamping (8514)